

1 **ABSTRACT**

2 A split-stream dictionary (SSD) program compression architecture has a
3 dictionary builder, a dictionary compressor, and a SSD item generator. The
4 dictionary builder constructs a dictionary containing two types of entries: (1) base
5 entries for each instruction in an input program and (2) sequence entries for
6 sequences of multiple instructions (e.g., 2-4 instructions) that are used multiple
7 times in the program. The dictionary compressor compresses the dictionary by
8 separately compressing the base entries and the sequence entries independently of
9 one another. The SSD item generator generates a stream of items that represent
10 the program instructions in terms of the base entries and the sequence entries. The
11 SSD program compression architecture outputs the compressed dictionary and the
12 stream of SSD items referencing the dictionary. The SSD program compression
13 architecture supports a two-phase just-in-time (JIT) translation having a dictionary
14 decompression phase and a copy phase. In the decompression phase, the VM
15 loads and decompresses the dictionary. In the copy phase, the VM expands each
16 basic block by copying dictionary entries into a native code buffer, thereby
17 effectively translating the SSD items back into the instructions.